

THAT WHICH IS CLAIMED IS:

1. A method of processing crude clay ore having a high grit content, comprising:
removing moisture entrained in crude clay ore;
pulverizing the crude clay ore into individual
5 mineral particles substantially simultaneously with the drying step; and
separating the individual mineral particles into respective product streams.

10 2. The method of Claim 1, wherein removing moisture and pulverizing the crude clay ore is performed by injecting the crude clay ore into a heated air stream flowing through a dryer, wherein the dryer comprises a plurality of rotating paddles, and wherein the air stream
15 forces the crude clay ore through the plurality of rotating paddles to pulverize the crude clay ore into individual mineral particles.

20 3. The method of Claim 2, wherein the heated air stream has a temperature of between about 600°F and about 1,000°F.

25 4. The method of Claim 2, wherein the heated air stream has a flow rate of between about five thousand cubic feet per minute and about fifty thousand cubic feet per minute (5,000 - 50,000 cfm).

30 5. The method of Claim 1, wherein separating the individual mineral particles into respective product streams comprises separating the individual mineral particles into sand, mica and kaolin product streams.

6. The method of Claim 1, wherein separating

the individual mineral particles into respective product streams comprises separating the individual mineral particles by particle size.

5 7. The method of Claim 1, wherein separating the individual mineral particles into respective product streams comprises:

 separating sand particles into a respective product stream via an air cyclone; and

10 separating mica and kaolin particles into respective product streams via an air classifier.

 8. The method of Claim 7, wherein separating sand particles via an air cyclone comprises separating sand particles having a size greater than about one hundred (100) mesh.

 9. The method of Claim 7, wherein separating mica particles into a respective product stream comprises separating mica particles having a size greater than about three hundred twenty five (325) mesh.

 10. A method of processing crude clay ore having a high grit content, comprising:

25 injecting crude clay ore having a grit content of between about five percent and seventy five percent (5% - 75%) into a heated air stream flowing through a dryer, wherein the dryer comprises a plurality of rotating paddles, and wherein the air stream forces the crude clay ore through the plurality of rotating paddles to pulverize the crude clay ore into individual mineral particles; and

30 separating the individual mineral particles into sand, mica and kaolin product streams.

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 11. The method of Claim 10, wherein the heated

air stream has a temperature of between about 600°F and about 1,000°F.

5 12. The method of Claim 10, wherein the heated air stream has a flow rate of between about five thousand cubic feet per minute and about fifty thousand cubic feet per minute (5,000 - 50,000 cfm).

10 13. The method of Claim 10, wherein separating the individual mineral particles into respective product streams comprises separating the individual mineral particles by particle size.

15 14. The method of Claim 10, wherein separating the individual mineral particles into respective product streams comprises:

 separating sand particles into a respective product stream via an air cyclone; and

20 separating mica and kaolin particles into respective product streams via an air classifier.

 15. The method of Claim 14, wherein separating sand particles via an air cyclone comprises separating sand particles having a size greater than about one hundred (100) mesh.

30 16. The method of Claim 14, wherein separating mica particles into a respective product stream comprises separating mica particles having a size greater than about three hundred twenty five (325) mesh.

 17. A method of processing crude clay ore having a high grit content, comprising:

35 injecting crude clay ore having a grit content of between about five percent and seventy five percent (5% - 75%) into a heated air stream flowing through a

dryer, wherein the dryer comprises a plurality of rotating paddles, and wherein the air stream forces the crude clay ore through the plurality of rotating paddles to pulverize the crude clay ore into individual mineral particles, wherein the heated air stream has a temperature of between about 600°F and about 1,000°F, and wherein the heated air stream has a flow rate of between about five thousand cubic feet per minute and about fifty thousand cubic feet per minute (5,000 - 50,000 cfm); and separating the individual mineral particles into sand, mica and kaolin product streams.

18. The method of Claim 17, wherein separating the individual mineral particles into respective product streams comprises separating the individual mineral particles by particle size.

19. The method of Claim 17, wherein separating the individual mineral particles into respective product streams comprises:

separating sand particles into a respective product stream via an air cyclone; and

separating mica and kaolin particles into respective product streams via an air classifier.

20. The method of Claim 19, wherein separating sand particles via an air cyclone comprises separating sand particles having a size greater than about one hundred (100) mesh.

21. The method of Claim 19, wherein separating mica particles into a respective product stream comprises separating mica particles having a size greater than about three hundred twenty five (325) mesh.